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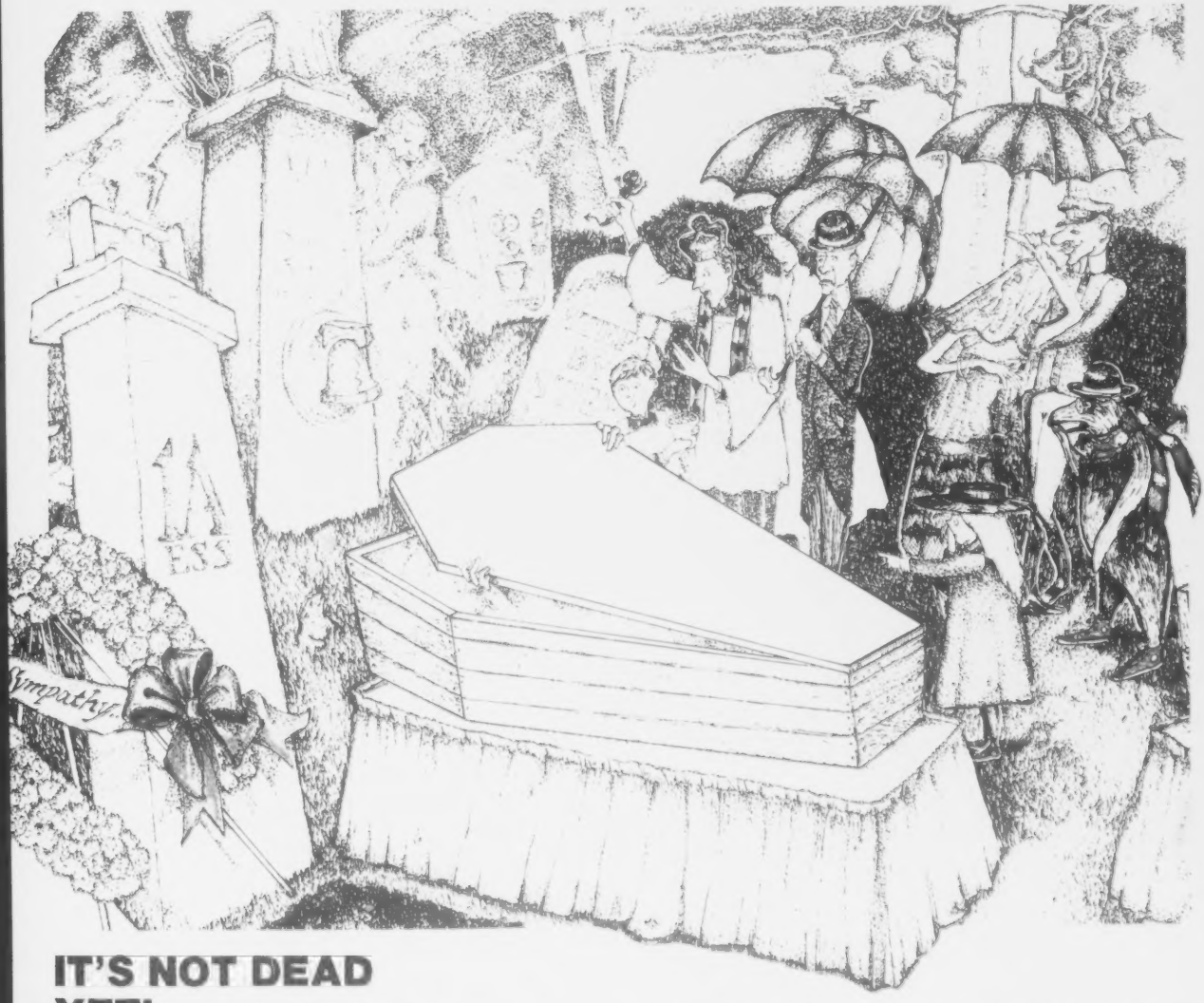

IT'S NOT DEAD YET!

Rumors of the demise of the feature-rich 1A have been greatly exaggerated

CALIFORNIA HERE WE ARE

Take a peek inside for a preview of this week's SUPERCOMM show

READY FOR ESIDENTIAL BROADBAND?

Every large LEC should already have a broadband plan on the drawing board

MONDAY, MAY 22, 1989 Volume 216, No. 21

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS

"Rumors of my death have been greatly exaggerated." Although this sentiment was uttered by Mark Twain, BOC managers feel the same way about their workhorse 1AESS analog switches. They're certainly not dead yet! Cover art by Laura M. Doyle

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Are you ready for residential broadband?

DAVID L. WENNER

The possibilities boggle the mind.

Viewers can select movies or past sporting events from a vast library of titles and watch them when convenient. Children can "own" an entire catalog of arcade games. Shoppers can tour their favorite malls on video, enter stores at will, call up demonstrations of interesting products and place orders for home delivery—all without the hassle of driving, parking or fighting the crowds.

The technology for bringing these applications and a multitude of others to the home is switched broadband, which will be ready for deployment in the 1990s. This marriage of switched voice, data and video transmission that it makes possible will open up the opportunity for on-demand, interactive services to the general public. And that development will change the telephone business in ways we've only begun to perceive. This technology will reach the marketplace at a critical time for local exchange carriers—when they need profitable growth to maintain their current high levels of stock market performance *(Telephony, Jan. 2, page 24)*.

Businesses clearly will provide a market for broadband data transmission services, but can LECs make residential broadband a success? It's an important question because of the financial ramifications: installing a nationwide residential broadband network in only half of U.S. residences could cost as much as $100 billion.

Shoppers can tour their favorite malls on video . . . without the hassle of driving, parking or fighting the crowds.

Residential broadband can succeed, and LECs can play a leading part in its development. To make that happen LECs must give as much attention to the strategic challenges of broadband as they and their suppliers are giving to its technical aspects. Otherwise, switched broadband could take twice as long to develop and LECs could find themselves locked out of all but basic transmission.

Revenue Streams

Although there is substantial uncertainty about demand, we estimate the annual revenue potential for residential broadband distributors to be between $35 billion and $80 billion when 50% of the U.S. households are wired (see story on page 99). The top of that range approaches the total revenues of all the LECs last year. This estimate would be significantly higher if the revenues associated with content provision were included.

The most obvious and largest

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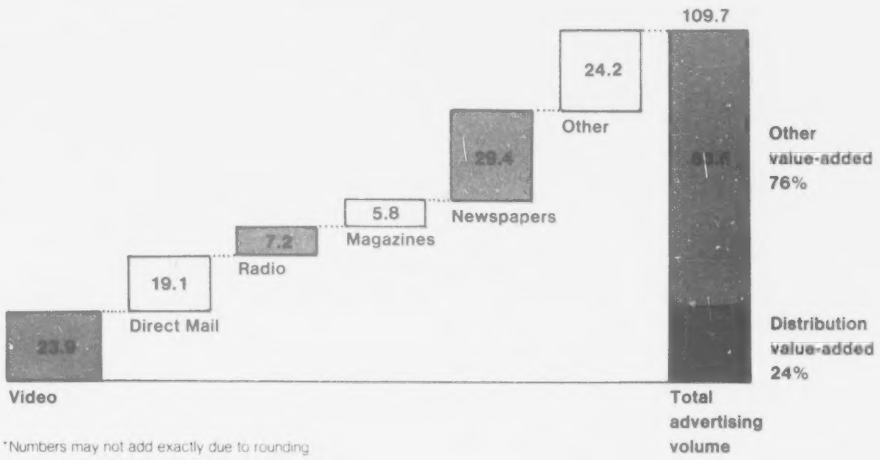
FIGURE 1 U.S. ADVERTISING VOLUME BY SOURCE – 1987*

$ Billions



*Numbers may not add exactly due to rounding

Source: McCann Erickson Inc., McKinsey estimates

source of revenue is from end-user charges, which could provide broadband distributors with an incremental revenue stream of between $16 billion and $40 billion. Not only can broadband supply consumers with all the entertainment services they now receive from cable and broadcast TV, it also can substitute for movie rentals from the neighborhood video store. And it can create new markets for information services and make videophone a reality.

The typical household receiving switched broadband services probably would spend about $75 a month for these services. This is about twice what the same household spends today on video entertainment for the home.

A second source of revenue for broadband operators will be provided by transaction services, which could provide between $5 billion and $15 billion in additional revenues. These revenues will come from retailers and intermediaries that will share a portion of their margin on goods and services purchased by consumers and pay fees for other customer services. Home shopping is a prime example, but banking and services such as reservations also are likely to be involved. Our revenue estimates are based on modest assumptions about the penetration of these services.

A third source of revenue is highly targeted advertising. In fact, the phrase "highly targeted" is an understatement. Broadband offers the ultimate in targeting—the ability to direct advertising to specific individuals. During a movie intermission, a boat owner can be shown marine accessories while a gardener, watching the same movie, can see lawn care equipment. As a result, the cost of reaching each targeted consumer should be far lower than in broadcast, making broadband attractive to advertisers who want to reach specific market segments. The trend toward product/market segmentation has made targeted marketing imperative. For example, Quaker Oats now has 30 brands of cereal, compared to only seven in 1969.

With the capability to reach specific market segments, broadband has the potential to claim a share of television advertising, direct mail and even some print advertising. All types of advertising totaled nearly $110 billion in 1987 (Figure 1). Allowing for growth in advertising revenue, if broadband reaches half of U.S. households, it can capture between $14 billion and $25 billion in advertising revenue. That includes 35% to 55% of all video advertising, 10% to 25% of direct mail advertising and 1% to 5% of print media advertising (Table 1).

If these estimates are accurate, broadband offers a revenue stream that is large enough to cover the $100 billion investment the LECs would have to make.

TABLE 1 DISTRIBUTION VALUE-ADDED: ADVERTISING — Estimate

Type of advertising	Distribution value-added—1988 $ Billions*	Share Percent	Assumptions
Video advertising	9-14	35-55	Broadband will substantially displace cable TV. Networks will retain a majority of national advertising, but broadband will capture a large share of *local* advertising due to targeting capability
Direct mail	1-3	10-25	Moderate share will be captured due to targeting capability of broadband
Radio, magazine, newspaper	0-2	1-5	Broadband has limited substitution potential since these media meet different consumer needs from video
New advertising	4-7	100	New advertising will be stimulated by targeting capability

*Calculated based on current revenues plus 15 years of growth, except for new advertising

Installing a nationwide residential broadband network in only half of U.S. residences could cost as much as $100 billion.

Name Your Game

Although a number of variations are possible, there are four principal roles an LEC can play in delivering the additional services possible with broadband technology: transporter, gateway, distributor and fully integrated provider.

The most basic role is transporter. The LEC would install and maintain the network and supply bandwidth and some switching capability to service providers. It would not add any additional value and would have little direct contact with end users. This role is similar to the role currently played by long-distance "carriers' carriers," such as Williams Telecommunications Group and Consolidated Network.

The transporter role is permitted by regulation and is already being provided to cable TV companies in a limited way by several LECs, including Ohio Bell in

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Cleveland and Chesapeake & Potomac Telephone Co. in Washington, D.C. A trial also is being conducted by Bell of Pennsylvania in Perryopolis. The LECs will at least play this basic role in broadband. The question is whether or not they will take a more significant role.

Acting as a gateway is the next step beyond simple transport. This role adds new functions and significant end-user contact (see story on this page). An LEC would integrate the activities of content, transaction and advertising service providers, supply necessary "host" information such as program menus and possibly have a major role in marketing, billing and customer support.

This role is roughly analogous to the narrowband "information gateway" role now being played by companies such as Compuserve and Prodigy and being tested by several Bell regional holding companies. In this role an LEC would not own any of the content transmitted to customers, but it would be viewed as the principal broadband provider by the majority of its customers. It would thereby acquire considerable bargaining leverage with content providers and advertisers, and strengthen its ties to current customers.

There are two other roles an LEC could play: distributor or fully integrated provider. The distributor role encompasses the transporter and gateway functions and adds content ownership. For example, LECs could legally own the content they provide just as cable companies now do, and could also maintain video libraries and information databases to offer to customers along with similar services provided by others.

As a fully integrated provider, an LEC would participate in content development, ranging from creating local databases or programming all the way to owning a

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The good and bad news about gateways

The gateway role provides a good example of the complex infrastructure and producer/intermediary/customer relationships that must be formed to support broadband applications. The gateway will have to deal with end users and also establish business relationships with a wide range of suppliers, such as entertainment libraries and information databases, transaction services companies and advertising providers. In addition, the gateway may negotiate arrangements with existing cable operators and national and local broadcast networks to obtain access to a wider range of programming and share advertising revenues.

Although there will always be several channels of information and entertainment available to consumers, broadband gateways could eventually handle the majority of value-added flow. The switching capability of the gateway makes it superior to existing cable and broadcast distribution because it can provide interactive access to multiple entertainment, information and communications applications, all available on demand.

Nevertheless, broadband gateways will still compete against broadcast and cable companies for both customer and advertiser revenues.

FIGURE 2 SERVICE FLOW FOR GATEWAY ROLE

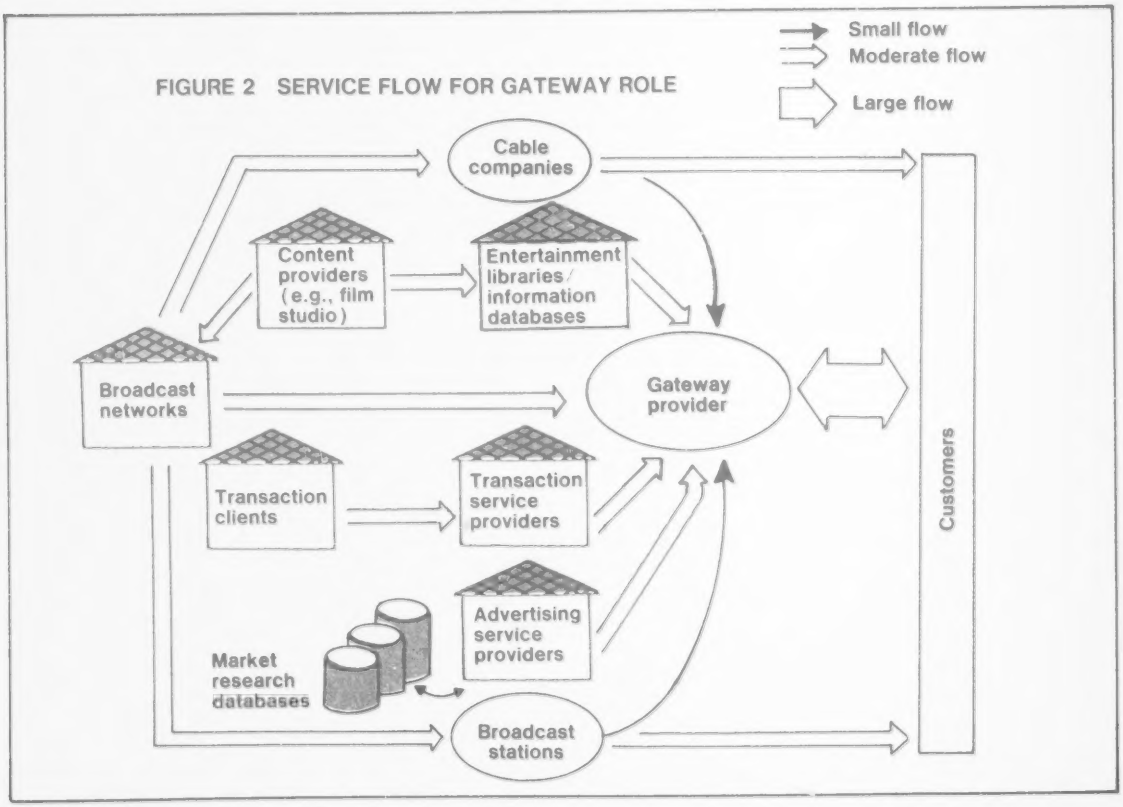

FIGURE 3 BROADBAND ROLES AND CHALLENGES

● Major challenge
◑ Moderate challenge
○ Minor challenge

Functions performed	Transporter	Gateway	Distributor	Fully integrated provider
– Transmission	✔	✔	✔	✔
– Customer billing and service		✔	✔	✔
– Customer marketing		✔	✔	✔
– Integration of content provider and advertiser activities		✔	✔	✔
– Ownership of content			✔	✔
– Development of content				✔
Challenges				
Legal/ regulatory				
- MFJ			●	●
- 1984 Cable Act		◑	●	●
- Possible "must carry" provisions		◑	◑	◑
- Rate-of-return regulation	◑	◑	◑	◑
Competitive				
- Existing competitors	◑	●	●	●
- New entrants	○	◑	◑	◑
- Lock in content	○	●	●	●
Technology	◑	◑	◑	◑
Skill-building	○	◑	●	●
Creation of infrastructure	◑	◑	◑	◑

Are You Ready *continued*

film production and distribution company. In cable TV, Time Inc., the second-largest multiple-system operator, plays this role. Time has 4 million cable subscribers, owns two movie channels—Home Box Office and Cinemax—and produces some of the films offered by these channels.

These roles are still largely conceptual. As debates continue on regulatory and competitive issues, these roles will become clearer. The important point is that each LEC must decide what role it will play in delivering broadband services.

Strategic Challenges

Aside from the obvious marketing and technological challenges of developing a viable switched broadband business, an LEC will face five other distinct but related strategic challenges: legal and regulatory, competitive, technological, skill-building and infrastructural (Figure 3).

All LECs, but especially the RHCs, face major legal and regulatory challenges in pursuing broadband. The Modified Final Judgment and the Cable Act of 1984 represent the greatest restrictions. The MFJ forbids the RHCs from being either "distributors" or "fully integrated providers" because of its prohibitions against providing content. The Cable Act prohibits all LECs from playing these roles because it classifies those who provide video content over wired networks as cable companies and then expressly forbids telephone companies from owning cable companies that operate within their telephone service areas.

Federal Communications Commission regulations under the Cable Act further restrict LECs from anything but arms-length relationships with content providers, though the FCC recently proposed softening this restriction to allow minority stock ownership, joint ventures and other alliances.

A less apparent obstacle lies in another aspect of the Cable Act that could dramatically slow the development of switched broadband gateways and be a disadvantage for LECs. Since video content providers are classified as cable companies when they operate through gateways instead of through distributors that own content they will have to obtain cable franchises from each of the local municipalities they want to serve. This process could be extremely time-consuming and costly, especially if contested by the

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Estimating revenue potential

It is impossible to project broadband revenue potential with great accuracy since the applications are new and will develop over a period of decades. Nevertheless, to provide a starting point for a company's own in-depth analysis, we have made a first, rough estimate of the revenues likely to be associated with distribution of broadband services. These revenues do not include payments to content providers.

We constructed a "revenue tree" that broke the revenue potential into components and sub-components. For each sub-component we then estimated the total revenue, the distribution portion of this revenue and the likely broadband share (see figure below). Finally, we gathered publicly available information on market sizes and growth rates and estimated broadband distribution revenues for the next 15 years, in today's dollars.

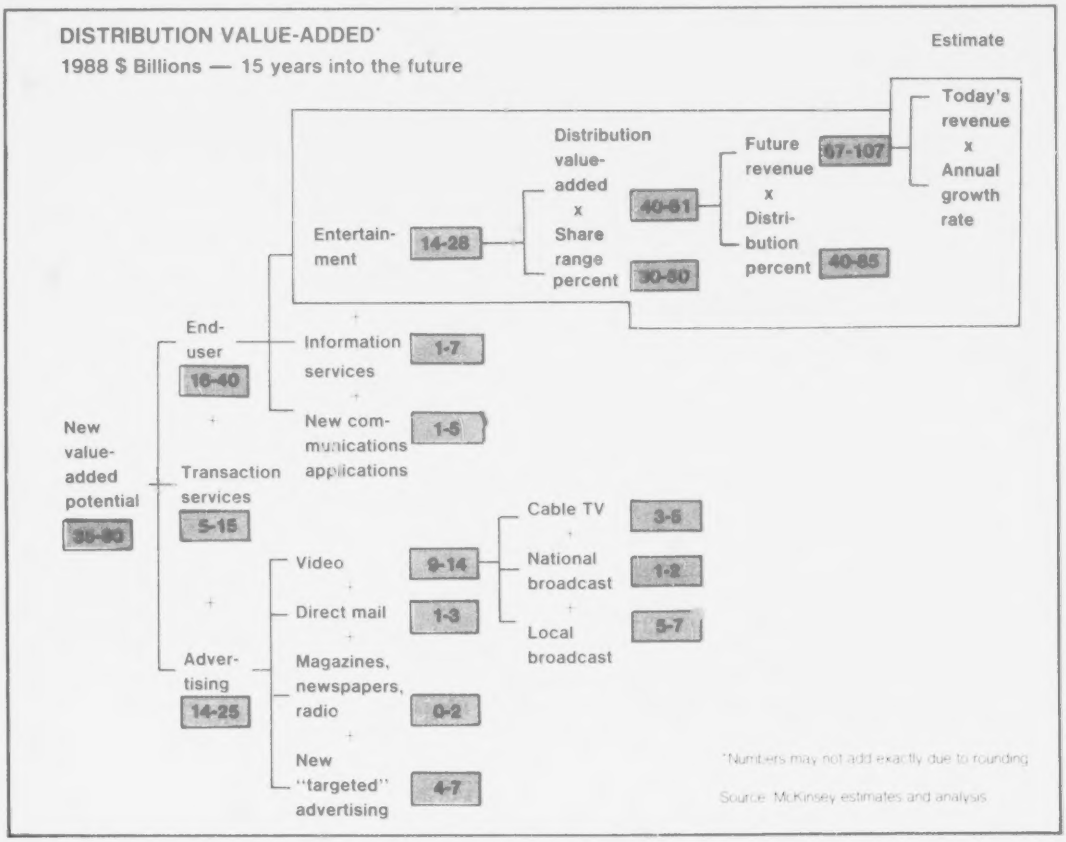
Here is an example of this process for one of the components—entertainment services—to clarify our approach. To estimate the total distribution revenue potential of entertainment services, we examined the historical growth rates of existing services that are similar to what would be offered over broadband. These include basic cable, pay cable, home video sales and rentals, movie theater receipts and game cartridge revenues.

For example, basic cable services generated about $6 billion in revenues in 1987, up from $3 billion in 1987 dollars in 1982, indicating a real growth rate of 15.6%. We then estimated the future growth rate of each service, depending upon our view of the market demand. For basic cable we used 7%, or about half of the historical rate, because it was consistent with a saturation level of 70% of households and a slowing of real price increases. Applying these individual growth rates, the total future revenue estimate for all entertainment applications fell between $67 billion and $107 billion.

We then estimated distribution value-added percents for each entertainment category using gross margin as a proxy. Gross margins range from 40% to 85% across entertainment applications, and when we applied the appropriate mix, we were left with a distribution value-added of between $40 billion and $61 billion for entertainment as a whole.

Next, we determined a possible share range for broadband given that its entertainment applications generally are superior to similar services available today (that is, movies on demand rather than through local rental outlets). We assumed various shares for broadband depending upon its attractiveness relative to existing services. Individual shares varied from zero (movie theater receipts) to between 38% and 50% (video sales and rentals), with the aggregate share range ending up between 30% and 50%. When we multiplied this share range by the distribution value-added range we ended up with a total for entertainment revenues of between $14 billion and $28 billion.

Other applications summarized below were established similarly.



current cable franchise. This possibility is especially onerous for LECs because they are precluded from being distributors and owning content while others are not.

Broadband offers the ultimate in targeting—the ability to direct advertising to specific individuals. During a movie intermission, a boat owner can be shown marine accessories while a gardener, watching the same movie, can see lawn care equipment.

An additional constraint that may affect the attractiveness of broadband gateways is the possible reinstatement of provisions by the FCC or Congress that would require them to carry broadcast programming and advertising without charge.

Finally, the continuation of rate-of-return regulation could discourage rapid construction of a broadband network by LECs. Although the FCC may seek to deregulate all broadband activities except transport, the transport function is likely to remain under price regulation, especially if the same network carries broadband services and basic telephone service. Whether or not broadband transport will be attractive enough to warrant aggressive development, as opposed to a more cautious approach, will depend heavily on the evolution of regulation and whether sufficient incentives are built in to reward risk-taking. Also at issue is whether regulatory mechanisms such as allowance for funds used during construction, or AFUDC, can bridge the gap between initial investment and significant revenue generation.

Competitive Pre-emption

Another equally important challenge exists in the competitive arena. The first threat comes from competitive reactions of existing cable and broadcast companies. These companies have high fixed costs and low marginal costs, so they probably will price aggressively to retain their market share. This action could substantially delay the profitability of broadband gateways.

In addition, it is likely that some of the larger cable companies will move aggressively into fiber and possibly to switched broadband networks. J.C. Sparkman, executive vice president and chief operating officer of Telecommunications Inc., says his company will invest several million dollars during the next few years to upgrade its systems with optical laser transmitters and AT&T optical fiber. American Television and Communications and Cablevision have made similar commitments to fiber.

New entrants to the residential communications market may pose an additional threat. For example, AT&T recently asked U.S. District Judge Harold Greene to follow the MFJ's original schedule that would allow restraints on its provision of information services to the home to expire. Freed of regulatory constraints, AT&T might wire some of the most desirable communities, gain the broadband-related revenues from these customers and simultaneously avoid payment of long-distance access charges to the LECs. Other companies, such as IBM, already are in information services and may also choose to play a national gateway role in broadband.

Another pre-emptive threat

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Developing a broadband plan

Although deployment of switched broadband is still a number of years away, every large LEC should already be developing a broadband plan. This plan should contain the following elements:

A fact-based point of view on the industry's future and how LEC action can influence it.

- *Demand.* LECs should go beyond basic analysis and study current usage and underlying customer needs and behavior to more carefully size the potential to understand how to prioritize and sequence development.
- *Regulation.* They also should get involved with the regulatory process. In particular, what can LECs do to remove the restrictions of the Modified Final Judgment and the Cable Act of 1984? How can they influence which broadband roles will be price-regulated? How can they help define incentive regulation in a way that makes the investment attractive enough to pursue aggressively?
- *Industry structure.* Because a core of broadband revenues may be generated at the expense of the existing broadcast and cable industries, broadband probably will trigger a restructuring of these industries. It also will create new sub-industries of information, entertainment and transaction content providers. To anticipate and influence this restructuring to their advantage, LECs must first understand how current information and entertainment providers will be affected under different scenarios of broadband development, what actions they could take to protect or strengthen their position, and who the new entrants are likely to be.

Each of these issues will have significant regional variations due to demographic differences, unique regulatory situations and specific local competitors.

An articulation of the desired role and its implications.

Because the legal and regulatory challenges, competitive threats and skills needed are role-specific, each LEC must choose a role before it can set priorities and focus its actions. For example, the RHCs might want to become seven identical regional gateways. This action might be coupled with a desire to provide selected information services that are particularly valuable or are unlikely to develop without support, and to influence the development of specialized CPE for these and other applications. This role is much more challenging than just providing local transport and has implications for the regulatory agenda, skill building and infrastructure development.

Strategies and programs for moving forward.

An LEC's near-term strategy will depend on its view of broadband's future and its role in that future. For example, its strategy will determine how quickly fiber is deployed and where. It also will influence the extent and the nature of desired cooperation with broadcast networks, and with cable companies in its service area.

could come from potential competitors, such as cable companies and the entertainment networks, that build links to information or entertainment providers to lock in the supply of content. That threat is particularly keen in entertainment, which is concentrated among a small group of suppliers. In 1986 the top five studios had a 60% share of box-office movie receipts.

The recently proposed merger of Warner Communications Inc. and Time Inc. raises exactly that concern. As a major distributor of cable entertainment, Time is trying to ensure continued access to good programming. While such moves cannot deny entertainment content to the LECs indefinitely, they could delay switched broadband's growth and make it difficult for LECs to earn adequate returns.

Technology Threat

New technology also is a threat.

Electronic processing and storage technology is advancing rapidly. For example, in 15 years a home computer might be coupled with CD-ROM and video disc technology to store massive amounts of information and entertainment on-line at a modest cost. When coupled with more efficient home distribution of media and narrowband links for transaction processing, this combination could compete with broadband. For example, "electronic catalog stores" could provide full-motion video shopping by distributing video discs by mail and processing orders over a low-speed network or the telephone system.

To be successful with switched broadband LECs must build the necessary corporate skills. LECs already know how to construct and maintain complex networks and provide accurate bills and good customer service. With continued evolutionary development, LECs can use these skills to become transporters of broadband.

To play any other role, LECs must develop new skills. To provide gateway service, for example, an LEC would have to establish a complex data network, provide and bill for many additional services, face more difficult marketing challenges and develop relationships with many content providers.

Further integration would require new skills ranging from database management to entertainment programming and talent procurement. Developing superior skills in any one of these areas would be a challenge; taken together they represent a decade or more of dedicated effort.

Which Came First?

An even greater challenge than developing new skills is ensuring that the appropriate infrastructure is there when needed. Here the LECs face a classic "chicken-and-egg" problem: They must simultaneously develop a market and its supporting infrastructure. In anticipation of demand, they must not only provide the network, but also ensure that a sufficient variety of applications and customer premises equipment is ready to make broadband valuable to a critical mass of customers. In addition, a whole new generation of information-processing software must be developed to link information and transaction providers to gateways, measure usage and support targeted advertising.

Given the high stakes involved, every large LEC should develop a broadband plan that begins with a carefully calculated view of future demand and an assessment of regulatory issues and potential industry structure.

Even if regulatory restrictions are removed, LECs will not be able to provide all of these critical elements themselves. They must, at the very least, cooperate with other industry members to develop common objectives and network interface standards. It will become even more of a challenge as LEC competition heats up.

If LECs want to act as gateways, they must agree on a common gateway architecture and perhaps even on identical gateways. And they must work with equipment manufacturers and information and entertainment suppliers to provide guidance, encouragement and possible financial incentive to invest ahead of customer demand.

Development of a broadband infrastructure is similar to the problem faced by the French when Minitel was developed. The problem is much greater, however, because of the fragmentation of the U.S. telecommunications industry and the scope of the effort.

Gearing Up

These challenges are not insurmountable, but they must be addressed if LECs are to reap the potential monetary rewards broadband offers. Clearly, decisions being made today will affect the shape of the switched broadband industry. Some LECs are deploying fiber more aggressively than others. Key legal and regulatory issues are being debated. Cable companies are making potentially pre-emptive moves and the entertainment industry is consolidating.

Given the high stakes involved, every large LEC should develop a broadband plan that begins with a carefully calculated view of future demand and an assessment of regulatory issues and potential industry structure. The plan should articulate the role the LEC wants to play and strategies to move forward (see story on page 100).

These efforts, although time-consuming for LECs, are essential because switched broadband offers enormous growth potential. The time to address these challenges is now—even though the market potential is unclear and technical issues are not yet resolved. T

David L. Wenner is a Director in the Atlanta office of McKinsey & Company, Inc. He was assisted in the preparation of this article by Michael E. Pralle and others at the firm.